

## **REMARKS/ARGUMENTS**

### **I. Status of the Claims**

After entry of this amendment, claims 1-17 are currently pending. Claims 1-4, 6-8 are currently being prosecuted. Claim 5 is cancelled. Claims 9-17 are withdrawn. Claim 1 is amended. Claim 18 is new. The amendments do not introduce new matter or raise new issues that would require further consideration and/or search.

### **II. The Invention**

The present invention relates to quinolones and compounds related to quinolones. One use of these quinolones and compounds thereof is for the inhibition of viruses, *e.g.*, HIV. The invention further relates to methods of making these compounds, methods of identifying the efficacy of these compounds, and methods of using these compounds to inhibit or prevent HIV infection and related disease states such as AIDS.

### **III. Support for the Amendments**

Support for the “substituted or unsubstituted heteroalkyl” amendment to claim 1 can be found on page 13, lines 13-24 of the specification. On page 13, R<sup>y</sup>, an equivalent of R<sup>6</sup> in Applicants’ claim 1, is defined as “substituted or unsubstituted heteroalkyl”, among other things.

Support for the “CN” amendment to claim 1 can be found in compounds 32-34 in Figure 1.

### **IV. Support for the New Claim**

Support for new claim 18 can be found in compounds 26-30 in Figure 1 as well as from page 15, line 24 to page 16, line 16 of the specification.

### **V. The Response to the Restriction Requirement**

The claims are restricted into four groups. Applicants acknowledge the election of Group I for prosecution on the merits. Each of compound claims 1-8 fall within Group I.

The election of the claims of Group I is made with traverse. The claims emerge from a common inventive concept; quinolones, quinolones further comprising fused cycloalkyl rings, pharmaceutical compositions comprising these quinolones, and the methods of forming compounds. The applicants respectfully submit that searching both the compositions as well as the method of making these compositions would not be an undue burden on the Examiner.

Claims 9-17 are drawn to methods of using the claimed composition to limit or prevent HIV infection. The claims are directly or indirectly dependent on claim 1, and thus incorporate every element of claim 1. When the allowability of claim 1 is determined, Applicants respectfully request that claims 9-17 be rejoined pursuant to M.P.E.P. § 821.04.

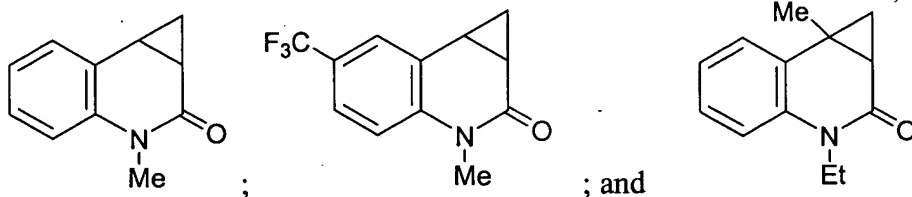
## VI. The Responses to the Rejections

### Under 35 U.S.C. § 102(b)

To maintain a *prima facie* case of anticipation, the Examiner must demonstrate that each and every element as set forth in the claim is either expressly found or is inherently described in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ...claim. See MPEP § 2131. Applicants submit that each element of the claims now pending has not been identified in the art presently of record. Therefore, Applicants respectfully traverse the following rejections.

### Over Loev (1967)

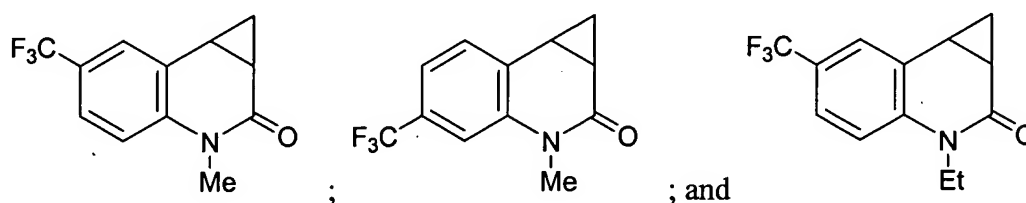
Claim 1 is rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Loev, *et al.*, Caplus English Abstract DN 67:120195 ("Loev (1967)"). Loev (1967) is cited by the Examiner for disclosing the following compounds:



In each of these cited compounds, the atom which is equivalent to Applicants' R<sup>6</sup> is hydrogen. Applicants have amended claim 1 so that R<sup>6</sup> is not hydrogen. Since Loev (1967) requires that R<sup>6</sup> is hydrogen, and Applicants do not claim hydrogen at this position, an element of Applicants' invention is not present in Loev (1967). Therefore, the rejection over claim 1 is improper. Applicants respectfully request the withdrawal of this rejection.

Over Loev (1966)

Claim 1 is rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Loev, *et al.*, Caplus English Abstract DN 66:2986 ("Loev (1966)"). Loev (1966) is cited by the Examiner for disclosing the following compounds:



In each of these cited compounds, the atom which is equivalent to Applicants' R<sup>6</sup> is hydrogen. Applicants have amended claim 1 so that R<sup>6</sup> is not hydrogen. Since Loev (1966) requires that R<sup>6</sup> is hydrogen, and Applicants do not claim hydrogen at this position, an element of Applicants' invention is not present in Loev (1966). Therefore, the rejection over claim 1 is improper. Applicants respectfully request the withdrawal of this rejection.

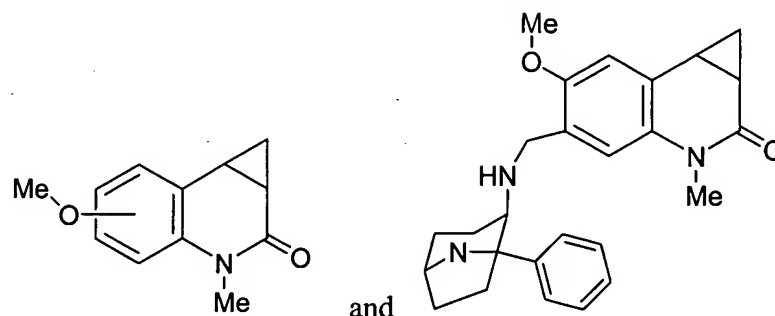
**VII. The Response to Arnold**

Over Arnold

The Examiner has cited Arnold *et al.*, PCT Pat. Pub. WO 2001077100 ("Arnold") as a prior art reference. Arnold is cited as teaching "a similar compound but the R<sub>2</sub> is different." No rejections were based upon Arnold, nor could any such rejection be made based on the currently pending claims.

Arnold does not anticipate Applicants' currently pending claims

Arnold has been cited by the Examiner. Arnold discloses the following compounds:



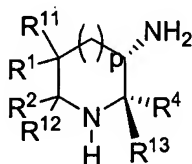
In each of these cited compounds, the atom which is equivalent to Applicants'  $R^6$  is hydrogen. Applicants have amended claim 1 so that  $R^6$  is not hydrogen. Since Arnold requires that  $R^6$  is hydrogen, and Applicants do not claim a compound with a hydrogen at this position, an element of Applicants' invention is not present in Arnold. Therefore, the rejection over claim 1 is improper. Applicants respectfully request the withdrawal of this rejection.

Arnold does not render Applicants' currently pending claims obvious.

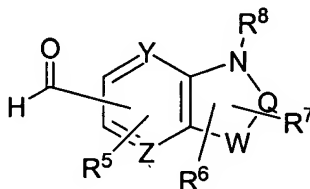
In order to establish a *prima facie* case of obviousness, the Examiner must demonstrate that (1) the references teach all the claimed elements; (2) there is a suggestion or motivation in the prior art to modify or combine the reference teachings; and (3) there is a reasonable expectation of success. MPEP § 2143; *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991). As explained below, Arnold fails to disclose or suggest Applicants' element of "substituted alkyl, substituted and unsubstituted heteroalkyl, CN, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl and  $C(O)R^{16}$ " at the equivalent of Applicants'  $R^6$  position. Since Arnold does not contain this element, there is neither a motivation to combine the reference teachings to produce Applicants' invention, nor a reasonable expectation of success derived from the references. Therefore, a *prima facie* case of obviousness cannot be made.

(1) *Arnold fails to teach all of the claimed elements*

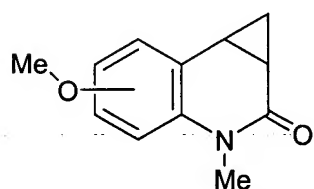
Arnold fails to teach Applicants' claimed element of "substituted alkyl, substituted and unsubstituted heteroalkyl, CN, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl and C(O)R<sup>16</sup>," at the equivalent of Applicants' R<sup>6</sup> position. The majority of this 217 page patent publication is directed to the addition of a piperidine compound according to the formula below:



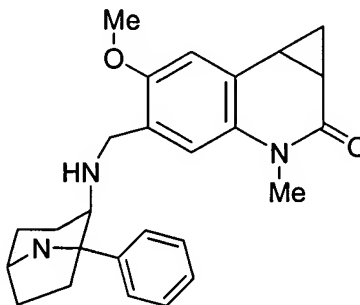
to a variety of benzoamides according to the formula below:



The only compounds in Arnold having a cyclopropyl ring fused to a quinolone are:



(page 45)



(page 67)

In both of these compounds, the equivalent to Applicants' R<sup>6</sup> position is a hydrogen. Since Arnold does not disclose any other moiety at this position, and Applicants do not claim compound having a hydrogen at this position, Arnold fails to teach all of the claimed elements of Applicants' invention. Therefore, a *prima facie* obviousness rejection cannot be maintained.

*(2) There is no suggestion or motivation to modify the teachings of Arnold*

Arnold also fails to suggest the desirability of any moieties aside from hydrogen at the equivalent of Applicants' R<sup>6</sup> position. As mentioned earlier, this is a very large publication with a large number of Formulas, each containing a wide variety of substituents. However, none of these Formulas describe anything other than a hydrogen at the equivalent to Applicants' R<sup>6</sup> position. Nor is there any discussion in Arnold of the equivalency of hydrogen with any other moieties at this position. Since Arnold does not contain this reference, there is no suggestion or motivation to modify Arnold for the purpose of Applicants' invention. Therefore, the *prima facie* obviousness rejection cannot be maintained.

*(3) Arnold does not provide a reasonable expectation of success*

Arnold also fails to provide a reasonable expectation of success in performing the Applicants' invention. As mentioned earlier, there is nothing in Arnold that suggests a moiety aside from hydrogen at the equivalent of Applicants' R<sup>6</sup> position. Since the compositions of the claimed invention require "substituted alkyl, substituted and unsubstituted heteroalkyl, CN, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl and C(O)R<sup>16</sup>" at the equivalent of Applicants' R<sup>6</sup> position, and Arnold does not contain a reference to these moieties, then Arnold does not create a reasonable expectation that its compounds can be successfully used in place of Applicants' compounds for the purpose of Applicants' invention. Therefore, the *prima facie* obviousness rejection cannot be maintained.

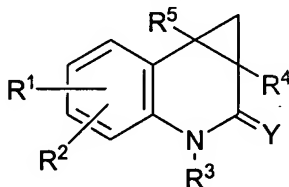
Because Arnold fails to teach all the claimed elements, does not contain a suggestion or motivation to modify the reference teachings, and does not provide a reasonable expectation of success, a *prima facie* case of obviousness cannot be set forth. Thus, Applicants respectfully request withdrawal of the rejection.

**VIII. Loev (U.S. Pat. No. 3,141,888) ("Loev '888").**

While reviewing the disclosure in Arnold, Applicants noticed that the cited compounds above were synthesized according to a procedure outlined in Loev (U.S. Pat. No. 3,141,888) ("Loev '888"). Applicants have included this patent in an IDS and wish to describe how Loev '888 does not anticipate or render Applicants' currently pending claims obvious.

Loev '888 does not anticipate Applicants' currently pending claims

Loev '888 discloses the following formula:



In this formula, R<sup>4</sup> is either hydrogen or C<sub>1</sub>-C<sub>4</sub> unsubstituted alkyl. Since Applicants do not claim a compound with a hydrogen at this position, an element of Applicants' invention is not present in Loev '888. Therefore, Loev '888 does not anticipate Applicants' currently pending claims.

Loev '888 does not render Applicants' currently pending claims obvious

As mentioned above, Loev '888 fails to teach Applicants' claimed element of "substituted alkyl, substituted and unsubstituted heteroalkyl, CN, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl and C(O)R<sup>16</sup>" at the equivalent of Applicants' R<sup>6</sup> position.

In addition, neither the formula above, nor the other formulas in Loev '888 describe anything other than hydrogen or C<sub>1</sub>-C<sub>4</sub> unsubstituted alkyl at the equivalent to Applicants' R<sup>6</sup> position. There is also no discussion in Loev '888 of the equivalency of hydrogen or C<sub>1</sub>-C<sub>4</sub> unsubstituted alkyl with any other moieties at this position. Since Loev '888 does not contain this reference, there is no suggestion or motivation to modify Loev '888 for the purpose of Applicants' invention.

Lastly, Loev '888 also fails to provide a reasonable expectation of success in performing the Applicants' invention. As mentioned earlier, there is nothing in Loev '888 that suggests a moiety aside from hydrogen or C<sub>1</sub>-C<sub>4</sub> unsubstituted alkyl at the equivalent of Applicants' R<sup>6</sup> position. Since the compositions of the claimed invention require "substituted alkyl, substituted and unsubstituted heteroalkyl, CN, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl and C(O)R<sup>16</sup>" at the equivalent of Applicants' R<sup>6</sup> position, and Loev '888 does not contain a reference to these moieties, then Loev '888 does not create a reasonable expectation that its compounds can be successfully used in place of Applicants' compounds for the purpose of Applicants' invention.

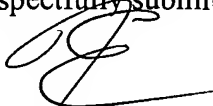
Because Loev '888 fails to teach all the claimed elements, does not contain a suggestion or motivation to modify the reference teachings, and does not provide a reasonable expectation of success, a *prima facie* case of obviousness cannot be set forth. Thus, Applicants respectfully request withdrawal of the rejection.

### CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-442-1000.

Respectfully submitted,



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